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TITLE: WATER-DISPERSIBLE METAL SURFACE TREATMENT
AGENT CONTAINING RUST INHIBITOR, SURFACE TREATED
METAL MATERIAL AND MANUFACTURING METHOD THEREFOR
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ABSTRACT:

PROBLEM TO BE SOLVED: To provide a surface treated metal material superior in various characteristics, a water-dispersible metal surface treatment agent superior in storage stability therefor, and a manufacturing method therefor.

SOLUTION: The water-dispersible metal surface treatment agent has 10-80 mass% of total solid contents, and comprises 40-90 mass%, in a solid

content,
of an ionomer resin, 1-10 mass% of a compound containing a water-soluble multifunctional epoxy group, 7-40 mass% of silica for adsorbing amino groups or ammonium ions, and 0.1-10 mass% of at least one rust inhibitor selected from thiocarbonyl compounds or ammonium vanadates. The above ionomer resin is an ethylene-unsaturated carboxylic acid polymer having a glass transition point of 50-70°C, and has 40-60% of carboxyl group neutralized with a monovalent metal cation per total contained carboxyl groups. Furthermore, the above compound containing the water-soluble multifunctional epoxy group includes chlorine of less than 1 mass%.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the water-dispersion metal finishing agent and the manufacture approach of rust-proofer content excellent in the storage stability which can obtain the surface treatment metal material which is excellent not only in fundamentality ability, such as corrosion resistance, coating adhesion, and alkali resistance, but solvent resistance and a sex with a blemish-proof, and its surface treatment metal material.

[0002]

[Description of the Prior Art] To the latest surface treatment metal material for household electric appliances, especially a zinc system plating steel plate, etc., the demand level to the so-called surface appearance grace, such as fingerprint-proof nature, corrosion resistance, and a sex with a blemish-proof, is increasing every year, and development of the finishing agent which can raise a surface practical use function in connection with it is at a quick pace, and is furthered. Therefore, for example, although it changes to phosphate processing and chromate treatment is in use in metaled after treatment and a metaled paint surface treatment technique in recent years Recently, even if it touches further with this clo mate's refractory-ization from a viewpoint of an environmental problem, a fingerprint is not attached. The inclination of various functions of a surface of metal and high-performance-izing -- that a surface function does not fall even if it wipes with the solvent to which the inconspicuous handling crack which does not carry out rusting from there cannot be attached easily, and back paintwork is good -- just increases every year. Especially about the finishing agent for metal after treatment, an improvement of a technique is remarkable and commercial-scene offer of the highly efficient metal material which gave the finishing agent which gave the highly efficient nature in non extra (there is no jump-ization of a price), and them came to be made in recent years.

[0003] There are JP,7-171498,A and JP,10-130861,A as an example of an indication of the policy which improves a sex with a blemish-proof. The former is related with the resin paint metal material which was characterized by making a thin film form in the upper layer of metal material using the coating constituent which it comes to add in the resin which blended the epoxy resin of an ordinary temperature bridge formation mold with the urethane resin which has active hydrogen for the particle and silica particle of polyethylene wax of the globular form which specified particle size and the melting point in intramolecular and which pierces and is excellent in workability. Moreover, it is related with the surface treatment metal material characterized by the latter coming to carry out the amount combination of specification of a silicic-acid alkali-metal salt, silicic-acid colloid, solid lubricant, and the organic resin (silane coupling agent), respectively. Each of both is the techniques for making commercial-scene offer as metal material for deep drawing for household-electric-appliances audio products.

[0004] Moreover, it is pollution-free in order to use neither phosphate nor a chromate, and there is JP,10-176119,A as an example which gave the corrosion resistance excellent in the surface of metal, and coating adhesion. This technique tends to raise metaled corrosion resistance and coating adhesion by specifying the compounding ratio of resin about the metal finishing agent obtained by carrying out the

polymerization of the ethylenic unsaturated monomer to the water polyester resin and the water-dispersion resin of an ethylene-ethylene nature unsaturated-carboxylic-acid copolymer alkali-metal neutralization object (ionomer) which specified the mean molecular weight.

[0005] Furthermore, the black discoloration preventive measures of the zinc which performed chromate treatment, or a zinc system plating steel plate with the passage of time are also important. For example, in JP,6-246229,A, JP,8-39725,A, JP,9-187883,A, and JP,9-187884,A, by each carrying out thin film spreading of the compound clear resin of an organic system on substrate chromate treatment, the corrosion of a galvanization layer is prevented and the technique of preventing discoloring black is indicated.

[0006] However, it was difficult to obtain the surface treatment metal material which satisfied solvent resistance, a sex with a blemish-proof, and mold-proof galling nature to coincidence, without spoiling corrosion resistance, coating adhesion, and alkali resistance, even if it used which above-mentioned conventional technique.

[0007]

[Problem(s) to be Solved by the Invention] when organic coating by the above-mentioned conventional technique is (3) thin films inferior to (2) quick-drying (gelation and mold grow) with which the (1) processing agent itself lacks in long term stability, (4) solvent resistance which gets damaged and is easy to be destroyed is inferior in (6) alkali resistance which cannot follow a paint film at processing of a material, but causes plate fracture in the low deep drawing of (5) non-oiling generally -- there is a difficulty of **. It is thought that these difficulties may happen not a little as long as a cause is in the emulsifier used in order to make water distribute the resin which the conventional technique has adopted and the water-dispersion resin dispersion-ized with this emulsifier and a thermosetting cross linking agent are used.

[0008] Therefore, the purpose of this invention is to offer the water-dispersion metal finishing agent excellent in the storage stability which can obtain the surface treatment metal material which made coincidence satisfied with a high order of solvent resistance, a sex with a blemish-proof, mold galling nature, deep drawing nature, postcoat nature, etc., and made them it, and its surface treatment metal material, and the manufacture approach, without spoiling alkali resistance, coating adhesion, and corrosion resistance.

[0009]

[Means for Solving the Problem] The result of having repeated research and development wholeheartedly in order that this invention persons might solve said technical problem, The ionomer resin which neutralized the carboxyl group of an ethylene-unsaturated-carboxylic-acid copolymer with the univalent metal cation as main resin for binders is used. By blending a silica and a rust-proofer, and the water-soluble polyfunctional epoxy group content compound ("a water-soluble epoxy compound" only being called hereafter) that controlled the chlorine content in the specific range further It turns out that the water-dispersion metal finishing agent excellent in the storage stability which can obtain the surface treatment metal material which is excellent in solvent resistance and a sex with a blemish-proof in addition to fundamentality ability, such as corrosion resistance, coating adhesion, and alkali resistance, and its surface treatment metal material is obtained, and comes to complete this invention.

[0010] The place made into the summary of this invention, the (1) total solid content concentration is 10 - 80 mass %. 40 in solid content - 90 mass % Ionomer resin, The silica to which water-soluble polyfunctional epoxy group content compound and 7 - 40 mass % made both the amino group, and both [one side or] stick [% / 1 - 10 mass] (the amino group or ammonium ion adsorption mold silica), It is the water-dispersion metal finishing agent by which 0.1 - 10 mass % was constituted from at least one sort of rust-proofers chosen from a thiocarbonyl compound or an ammonium vanadate. It is what was neutralized with the metal cation of the carboxyl group which said ionomer resin is the ethylene-unsaturated-carboxylic-acid polymer of 50-70 degrees C of glass transition points, and is contained univalent 40 to 60%. Furthermore, the water-dispersion metal finishing agent characterized by the chlorine content contained in said water-soluble polyfunctional epoxy group content compound being under 1 mass %, (2) A water-dispersion metal finishing agent given in the above (1) characterized by 0.5

in solid content - 20 mass % being constituted from water-dispersion polyolefin resin by the pan of a water-dispersion metal finishing agent, (3) 40 in solid content - 90 mass % on a metal material surface Ionomer resin, The silica to which water-soluble polyfunctional epoxy group content compound and 7 - 40 mass % made both the amino group, and both [one side or] stick [% / 1 - 10 mass], 0.1 - 10 mass % makes dry mass the organic inorganic compound coat which consisted of at least one sort of rust-proofers chosen from a thiocarbonyl compound or an ammonium vanadate, and has it 0.3-5.0 g/m². Said ionomer resin with the ethylene-unsaturated-carboxylic-acid polymer of 50-70 degrees C of glass transition points And it is what was neutralized with the metal cation of the carboxyl group contained univalent 40 to 60%. Furthermore, the surface treatment metal material characterized by the chlorine content in said organic inorganic compound coat being under 0.1 mass %, (4) Surface treatment metal material of the aforementioned (3) publication characterized by 0.5 in solid content - 20 mass % consisting of water-dispersion polyolefin resin at the pan of an organic inorganic compound coat, (5) -- the manufacture approach of the surface treatment metal material characterized by applying the water-dispersion metal finishing agent of a publication to the above (1) or (2), performing baking finish in the metal material surface upper layer, and forming in it two times 0.3 to 5.0 g/m by making an organic inorganic compound coat into dry mass -- it comes out.

[0011]

[Embodiment of the Invention] Hereafter, this invention is stated to a detail. The basic thought of the main resin development used for the metal finishing agent of this invention To fundamentality ability, such as corrosion resistance, coating adhesion, and alkali resistance, in addition, the thing which it does not dissolution-exfoliate or is not easily swollen to the strong solvent of polar groups, such as the time of (1) alkaline degreasing or ethanol, or a methyl ethyl ketone (MEK), that it (2) prints, a crack cannot be attached easily, and mold galling of the severe processing in press working of sheet metal etc. is not carried out easily, but it can moreover follow enough to the processing elongation of a substrate metal and (3) -- it is in being water-dispersion resin excellent in the storage stability which moreover does not have gelation and precipitate as binder resin. [in addition,]

[0012] Furthermore, it was cheap, and although the functional grant which can demonstrate sufficient coating adhesion also to low-grade postcoat paint of melamine alkyd with coating selectivity etc. was indispensable, about this, the water-soluble below-mentioned epoxy compound was considered as indispensable combination at the resin coat formed from a metal finishing agent. Moreover, in corrosion-resistant grant, the amino group or an ammonium ion adsorption mold silica was made indispensable, and rust-proofers, such as a thiocarbonyl compound and an ammonium vanadate, were further blended for high-order corrosion-resistant grant.

[0013] The ionomer resin neutralized with the univalent metal cation used by this invention The copolymerization reaction of ethylene and the unsaturated carboxylic acid is carried out under 150-270 degrees C and the elevated-temperature high pressure of 98-245MPa (1000 - 2500 kg/cm²). It is water-dispersion ionomer resin obtained by making it neutralize with the metal cation of the carboxyl group which the carboxylic acid of the obtained ethylene-unsaturated-carboxylic-acid copolymer is made to react with a metal hydroxide etc. under a 150-300-degree C elevated temperature, and it has in a side chain univalent 40 to 60%. Although a graft copolymer is sufficient as the ethylene-unsaturated-carboxylic-acid copolymer which constitutes the main frame of this ionomer resin, its random copolymer is desirable in respect of transparency.

[0014] As unsaturated carboxylic acid which is one component of an ethylene-unsaturated-carboxylic-acid copolymer, the unsaturated carboxylic acid of carbon numbers 3-8 is mentioned. As an example, an acrylic acid, a methacrylic acid, a maleic acid, boletic acid, an itaconic acid, a crotonic acid, isocrotonic acid, a citraconic acid, an allyl compound succinic acid, mesaconic acid, glutaconic acid, a NAJIKKU acid, a methyl NAJIKKU acid, a tetrahydro FUTARU acid, and methyl hexahydrophthalic acid are mentioned. Also in these, a methacrylic acid is desirable.

[0015] In addition to ethylene and unsaturated carboxylic acid, the ethylene-unsaturated-carboxylic-acid copolymer which constitutes the main frame of the above-mentioned ionomer resin may contain the 3rd component. If an example is carried out to such 3rd component, vinyl ester, such as unsaturated-

carboxylic-acid ester, such as a methyl acrylate (meta), an ethyl acrylate (meta), and isobutyl acrylate (meta), and vinyl acetate, is mentioned. In addition, the expression "the acrylic (meta)" used here means "an acrylic or methacrylic one."

[0016] The content of the ethylene in the above-mentioned ethylene-unsaturated-carboxylic-acid copolymer is eight to 95 mass %, and is eight to 25 mass % preferably. Moreover, when an ethylene-unsaturated-carboxylic-acid copolymer contains the 3rd component of the above, as for the amount, limiting to below 40 mass % is desirable.

[0017] Although univalent metal cations, such as Li⁺, Na⁺, and K⁺, are recommended in that the ionomer resin which has good emulsifiability as a metal cation used for neutralization of the above-mentioned ionomer resin is obtained, Na (sodium) ion is desirable especially. Whenever [rate / of the carboxyl group neutralized with the metal cation /, i.e., neutralization,] is made into 40 - 60% in that a good water dispersing element is obtained while excelling in the adhesion of a paint film. At less than 40%, since the adhesion of a paint film is inferior when a good water dispersing element is hard to be obtained and 60% is exceeded, it is not desirable.

[0018] The glass transition point (henceforth T_g) of the ethylene-unsaturated-carboxylic-acid copolymer by which neutralization adjustment was made these 40 - 60% needs to be 50-70 degrees C, and is 50-60 degrees C preferably. Since the flexibility of a coat will run short and the crack of the coat by processing etc. will occur if the sex with a crack-proof as a resin coat falls [T_g] at less than 50 degrees C, and a coat loses press working of sheet metal etc., and it is easy to start mold galling and T_g exceeds 70 degrees C, it is not desirable. Setting to this invention, T_g is JIS. K It is measured according to 7121.

[0019] a percentage [as opposed to total solids in the loadings (solid content conversion) of the above-mentioned water-dispersion ionomer resin] -- 40 to 90 mass % -- it is 50 to 80 mass % preferably. Since formation of a uniform coat becomes [this rate] difficult to a metal coated object under by 40 mass %, corrosion resistance falls remarkably. On the other hand, since the problem on paint arises, it is not desirable that the fall of a paint result appearance and washing of a paint facility take time amount etc., except that problems, such as being inferior to press workability, will arise since thickening of processing liquid influences and homogeneity control of thickness becomes difficult if 90 mass % is exceeded.

[0020] On the other hand, the water-soluble epoxy compound used by this invention is used in order to be stabilized and to acquire alkali resistance and the secondary adhesion of the paint film at the time of a postcoat to a high order. Although the percentage to the total solids of a water-soluble epoxy compound is one to 10 mass %, it is three to 7 mass % preferably. This blending ratio of coal becomes insufficient [the low-grade priming secondary adhesion of a postcoat, such as the base adhesion of a coat and a melamine alkyd system coating,] under by 1 mass %. On the other hand, if 10 mass % is exceeded, a paint film will make it hard superfluously, it becomes, or it is easy to carry out paint film exfoliation, and a crack becomes being easy to enter by processing.

[0021] The glycidyl group contained reacts with the carboxyl group of ionomer resin with heating after paint, and the water-soluble above-mentioned epoxy compound has the advantage which raises the adhesion over a base metal, the postcoat of one coat one BEKU (1C1B) paint of a household-electric-appliances application, etc. As the number of functional groups, the thing of three to 4 organic functions is desirable, and what is pentaerythritol glycidyl ether, glycerol polyglycidyl ether, etc. as the example, and adjusted chlorinity to under 1 mass % is mentioned. However, in the paint coat formed in the monofunctional epoxy compound from the metal finishing agent blended with ionomer resin, it is difficult to improve the function of secondary adhesion with a low-grade postcoat like melamine alkyd plastic paint. Moreover, when a functional group exceeds 5, since crosslinking density increases too much, hard-ization of a coat progresses and workability falls remarkably, corrosion resistance degradation may be caused.

[0022] About the viscosity of a water-soluble epoxy compound, the thing of 400 or less mPa-s and 350 more mPa-s or less is suitable at 25 degrees C from the field of paint workability. Moreover, the thing of the range of 6.0 - 7.5 eq/kg, and further 6.2 - 7.1 eq/kg is suitable for weight per epoxy equivalent from a reactant field.

[0023] Here, the chlorine of the epichlorohydrin origin whose polyfunctional epoxy compound currently used conventionally is a raw material remains mostly. Therefore, the metal finishing agent which contains this chlorine so much had bad storage stability, precipitate was produced with the passage of time, and also the coat formed with this processing liquid had troubles, like engine performance, such as corrosion resistance, is inferior.

[0024] So, in this invention, the water-soluble polyfunctional epoxy compound which adjusted chlorinity to under 1 mass % is used at the time of manufacture. And it becomes possible to improve the corrosion resistance of the surface treatment metal plate obtained by processing not only the long term stability of a processing agent but this processing agent by adjusting the amount of the chlorine further contained in a processing coat below 1 mass % in the amount of the chlorine contained in a water-soluble polyfunctional epoxy resin below to 0.1 mass %.

[0025] Moreover, the colloidal silica which the amino group and/or ammonium ion were made to stick to the front face of a particle-like silica with a particle size of 10-20nm, adjusted to pH 9.0-10.5 as the amino group used by this invention or an ammonium ion adsorption mold silica, and was distributed underwater is the optimal. In adjustment of pH, although any of the organic amino compound or aqueous ammonia may be used, use of the field of work environment to workability and the organic amino compound is desirable. Amino alcohol, diethanolamine, etc. can be mentioned as such an organic amino compound.

[0026] a percentage [as opposed to total solids in the loadings (solid content conversion) of this silica] - seven to 40 mass % -- it is 15 to 35 mass % preferably. Since a paint film will become hard too much, flexibility will fall and it will become easy to generate hair cracking etc. in the paint film of the bending section in press bending etc. if the sex with a crack-proof of a coat and a corrosion resistance fall arise under in 7 mass % and a silica exceeds 40 mass %, corrosion resistance also falls.

[0027] The rust-proofer used by this invention may satisfy many properties, such as passivation on the front face of a base metal by the adhesion and (3) rust-proofing ion which were excellent in osmosis prevention of (1) corrosion factor, and (2) rust-proofing coat for the purpose of control prevention of an external corrosion factor, and waterproof grant to (4) rust-proofing coat. what such a rust-proofer becomes from at least one sort of a thiocarbonyl compound and an ammonium vanadate -- it is -- these loadings -- 0.1 to 10 mass % -- it is one to 5 mass % preferably. Even if this will thicken if the corrosion resistance of a metal material is not enough and exceeds 10 mass % under by 0.1 mass %, coating-ization becomes difficult or it paints, under Rhine of the sex from Takao, it is difficult to acquire a uniform paint appearance continuously. In addition, in case a thiocarbonyl compound is used as a rust-proofer, phosphoric-acid ion may be used together by making the amount of 0.1 to 10 times of the loadings into a standard. Phosphoric-acid ion can be produced from the phosphoric-acid compound of the arbitration which produces phosphoric-acid ion in a water solution. As such a phosphoric-acid compound, a phosphoric acid, ammonium phosphate, potassium phosphate, sodium phosphate, etc. can be used, for example.

[0028] The thiocarbonyl group indicated below to be the above-mentioned thiocarbonyl compound (I)

[0029]

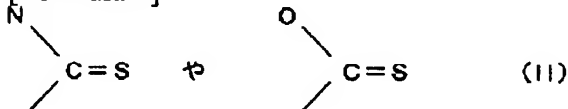
[Formula 1]



[0030] The thiocarbonyl group (II) which has the nitrogen atom which points out the compound which **** and is shown below also in it, and an oxygen atom in coincidence is desirable.

[0031]

[Formula 2]



[0032] Moreover, the compound which can form a thiocarbonyl compound in the conditions the inside of a water solution and under existence of an acid or alkali can also be used. As an example of the above-mentioned thiocarbonyl compound, it is the following formula (III).

[0033]

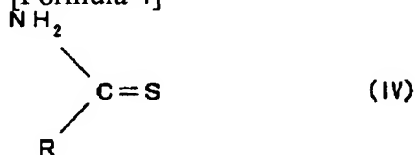
[Formula 3]



[0034] The thiourea come out of and expressed and its derivative, for example, a methylthio urea, dimethyl thiourea, ethyl thiourea, diethyl thiourea, diphenyl thiourea, a thiopental, thiocarbazide, thio cull BAZON, thio cyanuric acid, thiohydantoin, 2-thio URAMIRU, 3-thio urazole, the following formula (IV)

[0035]

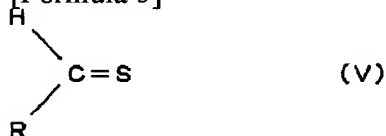
[Formula 4]



[0036] The thioamide compound come out of and expressed, for example, a thio formamide, thioacetamide, a thio propione amide, a thio benzamide, thio cull boss CHIRIRU, thio saccharin, the following formula (V)

[0037]

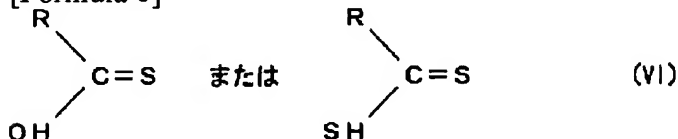
[Formula 5]



[0038] The thioaldehyde compound come out of and expressed, for example, thio formaldehyde, a thio acetaldehyde, the following formula (VI)

[0039]

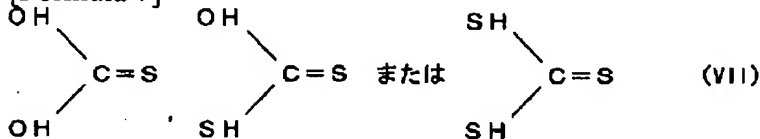
[Formula 6]



The thioic acid, for example, a thioacetic acid, come out of and expressed, thiobenzoic acid, a dithio acetic acid, the following formula (VII)

[0040]

[Formula 7]



[0041] It comes out and the thiocarbonic acids expressed and the other compounds which have the structure of a formula (I), for example, thio KUMAZON, thio spider CHIAZON, the thionine blue J, a

thio pyrone, a thio pilin, and a thio benzophenone are mentioned. In addition, what is not dissolved in water among the above-mentioned thiocarbonyl compounds is blended into a processing agent, after making it once dissolve with an alkali solution.

[0042] In addition, 0.5-20 mass % addition of can also be done at the water-dispersion metal finishing agent of this invention at a rate of occupying a water-dispersion olefine resin system wax to the total solid content concentration for the purpose of other functions, for example, lubricative grant.

[0043] Moreover, the component of further others [agent / concerning this invention / processing] may be blended. For example, a pigment, a surfactant, etc. can be mentioned. Moreover, in order to raise compatibility with a resinous principle, a silica particle, and a pigment and to raise adhesion with a resinous principle, a galvanization, or steel materials etc. further, a silane coupling agent may be blended.

[0044] As the above-mentioned pigment, inorganic pigments, organic pigments, etc., such as titanium oxide, a zinc oxide, a zirconium dioxide, a calcium carbonate, a barium sulfate, an alumina, kaolin clay, carbon black, and an iron oxide, can be used, for example.

[0045] As the above-mentioned silane coupling agent, gamma-aminopropyl trimethoxysilane, gamma-aminopropyl triethoxysilane, gamma-glycidoxypolytrimethoxysilane, gamma-glycidoxy propyltriethoxysilane, gamma-methacryloxypropyl triethoxysilane, N-[2-(vinylbenzylamino)ethyl]-3-aminopropyl trimethoxysilane, etc. can be mentioned, for example.

[0046] The water-dispersion metal finishing agent of this invention containing each above-mentioned component can be used by the total solid content concentration 10 - 80 mass %. The presentation of those other than solid content contains all the things that do not remain during a coat presentation after paint and printing, such as volatile pH regulator, although water is most. It becomes difficult to secure the film thickness stabilized since paint workability would worsen if the above-mentioned total solid content concentration cannot fully secure coat thickness under by 10 mass % but exceeds 80 mass %.

[0047] The preparation approach of the water-dispersion metal finishing agent of this invention adds the amino group of the specified quantity, or an ammonium ion adsorption mold silica to the water dispersing element of ionomer resin, adds water and an alkali component, and adjusts pH. In order to gasify in a desiccation process and to make it alkalinity not remain into a solid coat as an alkali component to add, alkali water solutions, such as an organic amino compound or aqueous ammonia, are desirable. Moreover, although not asked, after adjusting to about 10 order preferably, the pH adds the water-soluble epoxy compound of the specified quantity, if the processing agent of this invention is alkalinity, at 40 degrees C or less of solution temperature, for about 10 minutes, may carry out DISUPA stirring and will mix it. In addition, it is better for especially this technique to avoid preferably [although heating fusion of the mixture of ionomer resin and a water-soluble epoxy compound is carried out and there is also the technique of carrying out package emulsification / when making an inorganic system rusr-proofer live together], since precipitate may be generated.

[0048] The art of this invention processes a metallic material by the water-dispersion metal finishing agent of this invention, and bakes it after that. Although there is especially no limit as an art, the roll coater method is desirable, in addition there are dip coating, a spray method, etc. Coating weight of a paint film is made into 0.3 - 5.0 g/m² with dry mass. In less than two 0.3 g/m, since corrosion resistance deteriorates, it is not desirable. Moreover, the thing exceeding 5.0 g/m² is not economically desirable. Moreover, 2 seconds - 30 minutes and 4 more seconds - 10 minutes of stoving temperature are [80-180 degrees C and printing time amount] desirable.

[0049] As the above-mentioned metallic material, there is especially no limit and it can be applied to metallic materials, such as the unsettled steel materials of tabular or other configurations, electrogalvanizing steel materials, hot-dip-zincing steel materials, gal barium steel materials, aluminum material, aluminium alloy material, and other copper material. Furthermore, the metal-plastics composite which laminated various metals in plastic material is also contained in the metallic material of the object of this invention. Thus, since the surface treatment metal material of manufactured this invention is covered with the water-dispersion metal finishing agent of this invention, without performing chromate treatment, it becomes pollution-free and the thing excellent in solvent resistance, a

sex with a blemish-proof, and postcoat nature.

[0050]

[Example] Hereafter, an example is given and this invention is explained concretely.

[0051] (Examples 1-121, examples 1-35 of a comparison)

After methacrylic-acid content 15 mass %) and a neutralizer having fused the sodium hydroxide at 250 degrees C by 190 degrees C for 0.8g / 10 minutes, and the melting flow characteristic's (MFR's) having prepared ionomer resin melt and adding 300g of water to this, it taught the proof-pressure homomixer of 1l. of 100g [of <preparation of water-dispersion metal finishing agent> ethylene-methacrylic-acid copolymers] [content volume heated at 170 degrees C over about 2 hours, stirring by 1000rpm. After preparation termination, stirring was continued for further 1 hour, it cooled to the room temperature, and the water dispersing element of ionomer resin was obtained.

[0052] A chlorine content under by 1.0 mass % as an epoxy compound next, pentaerythritol polyglycidyl ether (1410 DENAKORU EX- Nagase Brothers formation product made from industry) of 100% of rates of aqueous-izing Moreover, the colloidal silica which the front face adsorbed ammonium ion as a silica, and was controlled by alkalinity is prepared. Many things were blended with the mass percentage which shows ionomer water dispersing element resin, an epoxy compound, and a silica in Table 1-4, and 8, and they were stirred in DISUPA during 60 minutes by 500rpm. In addition, the ionomer resin in Table 1-4, and 8 and mass % of colloidal silica are the values converted into solid content.

[0053] and stirring -- on the way -- coming out -- amino alcohol -- pH -- 10 -- adjusting -- stirring -- after 10-minute continuation-line **** and as a rust-proofer -- A:thiourea, B:1, 3-diethyl-2-thiourea, C:thioacetamide, D:2, and 2' -- many things were blended with the mass percentage which shows - JITORIRUCHIO urea, E:thiobenzoic acid, F:thio acetaldehyde, G:ammonium vanadate, and ammonium phosphate in Table 1-4, and 8. And after continuing stirring further and completing stirring for a total of 60 minutes, it filtered with the 200-mesh filter, pure water (accepting the need) adjusted the filtrate, and it considered as the water-dispersion metal finishing agent of this example or the example of a comparison.

[0054] 2% water solution of a <paint to steel plate> degreaser ("the surfboard cleaner 155", Nippon Paint Co., Ltd. make) On the front face of the electrolytic zinc-coated carbon steel sheet (amount of eyes 20 g/m²) of 1.2mm of board thickness dried by rinsing after a spray for 60 seconds at 60 degrees C After applying by the bar coating machine so that the solid coat of the above-mentioned water-dispersion metal finishing agent may serve as 0.3 - 5.0 g/m², baking finish of a paint film was performed and the test piece was produced so that outlet side board temperature might become 120 degrees C in in-furnace time 20 seconds in a gas furnace. In addition, measurement of coating weight was performed with the weight method.

[0055] Rinsing desiccation of the one half of a test piece was carried out at 2% water solution of a <performance evaluation test> 1 alkali-resistance alkaline-degreasing agent (SC53, Nippon Paint Co., Ltd. make) after 55 degrees-C x 10-minute immersion of solution temperature, and comparison observation of the soundness of a paint film appearance and the removing-of-coating-proof nature was carried out with the non-immersed section.

O Abnormality [in :paint film] nothing, O: They are appearance discoloration, **:partial removing of coating, and whole x:surface removing of coating [0056] slightly. 2) Milkiness-proof nature (priming-proof trial of a paint film)

After the one half of a test piece was immersed in the boiling water of pure water for 2 hours, the test piece was pulled up, and it waited for the air drying, and the appearance difference of the immersion section and the non-immersed section was judged visually.

O : -- the difference nothing of an appearance, and O: -- small -- the immersion section -- those with decolorization, those with **:partial milkiness, and x:complete milkiness [0057] 3) Use a mold galling nature cylinder ERIKUSEN press. The non-oiling diaphragm omission of a test piece is performed by diameter cylinder of 50mm, contraction-ratio 2.4, 1.0mm [of board thickness], and path clearance 0.0mm, and the blank holder pressure of 1.5t, and the mold galling situation of a cylinder drum section

is observed.

O :galling nothing and O: -- small -- gnawing -- **: -- partial -- gnawing -- whole x:surface galling [0058] 4) Corrosion resistance JIS Z The salt spray test based on 2371 was performed. The test piece (an end face and a rear face are a tape seal) with the Erichsen 6mm extruding section and the flat-surface section was produced, and the white rust generating situation was evaluated 168 hours after the salt fog.

O :rust nothing, O: 5% or less of surface ratio, **:5-30%, more than x:30%[0059] To the piece of a postcoat secondary adhesion test, 5) A melamine alkyd-resin system coating (white) JIS after immersing and carrying out indoor neglect for 24 hours for 30 minutes at the pure water boiled after being burned on the desiccation thickness of 20-25 micrometers, and the conditions for 125 degree-Cx 20 minutes K By the cross cut adhesion test based on 5400 It was close to the test piece in the 100 squares of 1mm angle, and forcible exfoliation was carried out in the direction 45 degrees with marking and adhesive tape (a "Scotch tape", Nichiban Co., Ltd. make).

O :exfoliation nothing, O : they are exfoliation, **:partial avulsion, and x:complete exfoliation [0060] slightly. 6) Dye the dissolution appearance of the paint film after infiltrating load 1kgx10 time (round trip) and MEK (methyl ethyl ketone) into a solvent-resistance SUS round bar end face and grinding the gauze of the eight-sheet pile into which ethanol was infiltrated against it 1kg x 50 times of loads (round trip) with a special color, and judge from the difference of whenever [dyeing].

O : -- abnormality nothing and O: -- small -- the dissolution, the **:partial dissolution, and the x:complete dissolution (base exposure)

[0061] 7) It is a precipitate generating situation in the processing agent at the time of 40 degree-Cx carrying out the passage of time on the 30th after the epoxy compound addition from which the precipitate generating all chlorinity of a processing agent differs Evaluation O : Abnormality nothing, O: The ***** nothing and **:nebula **** which become cloudy slightly are also precipitate nothing and x:precipitate size [0062]. A combination presentation and evaluation result of a processing agent are shown in Table 1-4, and 8. By the corrosion resistance and upper limit side, there is a damage and these results show that it is better for press workability, such as spinning, to avoid at a minimum side, when the amount of silicas in a processing agent separates from the range of this invention. Moreover, when the loadings of ionomer resin separate from the range of this invention, a damage is serious at corrosion resistance, press-die galling nature, and the secondary adhesion of the postcoat by melamine alkyd, and since it is inferior to press working of sheet metal, such as spinning, a little, by the upper limit side, it turns out that it is not desirable at a minimum side.

[0063] Moreover, as for the precipitate generated in processing liquid, it turns out to the passage of time that it will become cloudy or precipitate it if the chlorine content in a water-soluble epoxy compound exceeds 1 mass %. Moreover, about the water-soluble epoxy compound which controlled the chlorine content, when the amount separates from the range of this invention, the secondary adhesion of a postcoat deteriorates and it turns out by the upper limit side that overall aggravation of paint film engine performance, such as alkali resistance, milkiness-proof nature, and resistance to scuffing, is caused at a minimum side.

[0064] Furthermore, when Tg of ionomer resin separates from the range of this invention, in a minimum side, it turns out that a coat becomes soft, mold-proof galling nature is inferior, the flexibility of a coat runs short in an upper limit side, and it is inferior to die-galling-proof nature. About whenever [neutralization / of an ionomer], when it separates from the range of this invention, by the minimum side, it turns out that the stability of processing liquid deteriorates and the secondary adhesion of a postcoat deteriorates in an upper limit side. About the coating weight of an organic inorganic compound coat, when it separates from the minimum range of this invention, it turns out that not only corrosion resistance but die-galling-proof nature and secondary adhesion deteriorate.

[0065] Moreover, when the amount of a rust-proofer separates from the range of this invention, in a minimum side, a corrosion resistance fall is large, and when it separates from an upper limit conversely, a damage is serious at die-galling nature and the secondary adhesion of a postcoat.

[0066] (Examples 122-206) (when water-dispersion polyolefin resin is added as an aqueosity wax)

After number average molecular weight blended many things with the mass percentage which shows the

water-dispersion polyolefin resin (solid content conversion) which is 1500 and the particle size of 0.7 micrometers in Tables 5-7, carried out DISUPA stirring during 30 minutes by 500rpm and tuned pH finely with amino alcohol in the middle of stirring to the water-dispersion metal finishing agent manufactured to each example and the object for the examples of a comparison as stated above, it filtered with the 200-mesh filter and the filtrate was made into the water-dispersion metal finishing agent which gave the lubrication function. These presentations and an evaluation result are shown in Tables 5-7.

[0067] It turns out that the operation effectiveness of ionomer resin and a silica which the effect on alterity ability will be almost ineffective if addition of the polyolefin resin which is lubricant is this invention within the limits, and constitutes a processing agent from these results is also the same effectiveness as polyolefin resin addition before.

[0068]

[Table 1]

表 1

		処理剤、皮膜固形分組成										処理条件		評価						
		アイオノマー樹脂			シリカ配合量 (質量%)	水溶性エポキシ化合物		防錆剤		リン酸アンモニウム配合量 (質量%)	処理剤終固形分濃度 (質量%)	乾燥付着量 (g/m ²)	焼付温度 (°C)	耐アルカリ性	耐白化性	耐曇かしり性	耐食性	二次塗装密着性	耐溶剤性	処理剤の貯蔵安定性
配合量 (質量%)	Tg (°C)	中和度	塩素量 (%)	配合量 (質量%)	種類	配合量 (質量%)	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%	質量%
実施例	1	70	55	50	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	2	40	55	50	40	0.5	9	A	10	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	3	60	55	50	34	0.5	10	A	5	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	4	90	55	50	7	0.5	1	A	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	5	85	65	60	7	0.5	5	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	6	77	55	50	15	0.5	5	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	7	52	55	50	40	0.5	5	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	8	72	55	50	24	0.5	1	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	9	70	55	50	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	10	66	55	50	24	0.5	7	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	11	83	55	50	24	0.5	10	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	12	71.9	55	50	24	0.5	3	A	0.1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	13	89	55	50	24	0.5	5	A	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	14	65	55	50	24	0.5	5	A	5	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	15	60	55	50	24	0.5	5	A	10	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	16	68	55	50	24	0.5	5	A	2	1	10	1	120	◎	◎	◎	◎	◎	◎	◎
	17	68	55	50	24	0.5	5	A	2	1	50	1	120	◎	◎	◎	◎	◎	◎	◎
	18	68	55	50	24	0.5	5	A	2	1	80	1	120	◎	◎	◎	◎	◎	◎	◎
	19	70	50	50	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	20	70	60	50	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	21	70	70	50	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	22	70	55	40	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	23	70	55	45	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	24	70	55	55	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	25	70	55	60	24	0.5	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	26	70	54	50	24	0.1	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	27	70	55	50	24	0.8	3	A	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	28	70	55	50	24	0.5	3	A	2	1	20	0.3	120	◎	◎	◎	◎	◎	◎	◎
	29	70	55	50	24	0.5	3	A	2	1	20	0.6	120	◎	◎	◎	◎	◎	◎	◎
	30	70	55	50	24	0.5	3	A	2	1	20	1.5	120	◎	◎	◎	◎	◎	◎	◎
	31	70	55	50	24	0.5	3	A	2	1	20	3	120	◎	◎	◎	◎	◎	◎	◎
	32	70	66	50	24	0.5	3	A	2	1	20	5	120	◎	◎	◎	◎	◎	◎	◎

[0069]

[Table 2]

表 2

	処理剤、皮膚固形分組成										処理剤の貯蔵安定性																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
	フイオノマー樹脂	シリカ配合量	水溶性エポキシ化合物		防錆剤		リン酸アンモニウム配合量	処理剤の固形分濃度	評価																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
									乾燥付着量	焼付温度		耐アルカリ性	耐白化性	耐型かじり性	耐食性	二次変質密着性	耐溶剤性																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											
配合量 (質量%)	T _g (℃)	中和度	塩基量 (%)	配合量 (質量%)	種類	配合量 (質量%)	(質量%)	(g/m ²)	(℃)																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
実施例	33	70	55	50	24	0.5	3	A	2	1	20	1	80	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

[0070]

[Table 3]

表 3

	処理剤、皮膚固形分組成										処理条件		評価							
	アイオノマー樹脂			シリカ配合量 (質量%)	水溶性エポキシ化合物		防錆剤		リン酸アンモニウム配合量 (質量%)	処理剤総固形分濃度 (質量%)	乾燥付着量 (g/m ²)	残付温度 (°C)	耐アルカリ性	耐白化性	耐型かじり性	耐食性	二次塗装密着性	耐溶剤性	処理剤の貯蔵安定性	
	配合量 (質量%)	T6 (°C)	中和度		塩素量 (%)	配合量 (質量%)	種類	配合量 (質量%)												
実施例	65	66	55	50	24	0.5	7	B	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	66	63	55	50	24	0.5	10	B	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	67	71.9	55	50	24	0.5	3	B	0.1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	68	69	55	50	24	0.5	6	B	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	69	65	55	50	24	0.5	5	B	5	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	70	60	55	50	24	0.5	5	B	10	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	71	70	55	50	24	0.5	3	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	72	40	55	50	40	0.5	9	C	10	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	73	50	55	50	34	0.5	10	C	5	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	74	90	55	50	7	0.5	1	C	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	75	85	55	50	7	0.5	5	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	76	27	55	50	15	0.5	5	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	77	52	55	50	40	0.5	5	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	78	72	55	50	24	0.5	1	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	79	70	55	50	24	0.5	3	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	80	68	55	50	24	0.5	7	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	81	83	55	50	24	0.5	10	C	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	82	71.9	55	50	24	0.5	3	C	0.1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	83	69	55	50	24	0.5	5	C	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	84	65	55	50	24	0.5	5	C	5	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	85	60	55	50	24	0.5	5	C	10	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
例	86	70	55	50	24	0.5	3	D	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	87	70	55	50	24	0.5	3	E	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	88	70	55	50	24	0.5	3	F	2	1	20	1	120	◎	◎	◎	◎	◎	◎	◎
	89	70	55	50	25	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎
	90	40	55	50	40	0.5	10	G	10	-	20	1	120	◎	◎	◎	◎	◎	◎	◎

[0071]

[Table 4]

表 4

	処理剤、皮膜固形分組成										処理剤固形分濃度 (質量%)	処理条件		評価									
	アイオノマー樹脂			シリカ 配合量 (質量%)	水溶性エポキシ化合物		防錆剤		リン酸 配合量 (質量%)	乾燥付着量 (g/m ²)		焼付温度 (°C)	耐アルカリ性	耐白化性	耐型かじり性	耐食性	二次塗装密着性	耐溶剤性	処理剤の貯蔵安定性				
	配合量 (質量%)	T E	中和度 (%)		塩素量 (%)	配合量 (質量%)	種類	配合量 (質量%)															
実施例	91	50	55	50	35	0.5	10	G	3	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	92	90	55	50	8	0.5	1	G	1	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	93	86	55	50	7	0.5	5	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	94	78	55	50	15	0.5	5	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	95	53	55	50	40	0.5	5	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	96	73	55	50	24	0.5	1	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	97	71	55	50	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	98	87	55	50	24	0.5	7	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	99	84	55	50	24	0.5	10	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	100	72.9	55	50	24	0.5	3	G	0.1	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	101	70	55	50	24	0.5	5	G	1	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	102	66	55	50	24	0.5	5	G	5	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	103	61	55	50	24	0.5	5	G	10	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	104	71	50	50	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	105	71	60	50	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	106	71	70	50	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	107	71	55	40	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	108	71	55	45	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	109	71	55	55	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	110	71	55	60	24	0.5	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
	111	71	55	50	24	0.1	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎			
112	71	55	50	24	0.8	3	G	2	-	20	1	120	◎	◎	◎	◎	◎	◎	◎				
113	71	55	50	24	0.5	3	G	2	-	20	0.3	120	◎	◎	◎	◎	◎	◎	◎				
114	71	55	50	24	0.5	3	G	2	-	20	0.6	120	◎	◎	◎	◎	◎	◎	◎				
115	71	55	50	24	0.5	3	G	2	-	20	1.5	120	◎	◎	◎	◎	◎	◎	◎				
116	71	55	50	24	0.5	3	G	2	-	20	3	120	◎	◎	◎	◎	◎	◎	◎				
117	71	55	50	24	0.5	3	G	2	-	20	5	120	◎	◎	◎	◎	◎	◎	◎				
118	71	55	50	24	0.5	3	G	2	-	20	1	80	◎	◎	◎	◎	◎	◎	◎				
119	71	55	50	24	0.5	3	G	2	-	20	1	100	◎	◎	◎	◎	◎	◎	◎				
120	71	55	50	24	0.5	3	G	2	-	20	1	150	◎	◎	◎	◎	◎	◎	◎				
121	71	55	50	24	0.5	3	G	2	-	20	1	180	◎	◎	◎	◎	◎	◎	◎				

[0072]

[Table 5]

表 5

	処理剤、皮膜固形分組成										処理剤の貯蔵安定性	評価											
	アイオノマー樹脂			シリカ配合量 (質量%)	水溶性エポキシ化合物		防錆剤		リン酸アンモニウム配合量 (質量%)	処理剤の貯蔵安定性		処理条件		評価									
	配合量 (質量%)	Tg (°C)	中和度		塩基量 (%)	配合量 (質量%)	種類	配合量 (質量%)				乾燥付着量 (g/m ²)	焼付温度 (°C)	耐アルカリ性	耐酸化性	耐型かじり性	耐食性	二次変質密着性	耐溶剤性	処理剤の貯蔵安定性			
実施例	122	60	55	50	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	123	40	55	50	35	0.5	9	A	10	1	5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	124	49	55	50	34	0.5	10	A	5	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	125	89.5	55	50	7	0.5	1	A	1	1	0.5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	126	63	55	50	7	0.5	5	A	2	1	20	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	127	67	55	50	15	0.5	5	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	128	42	55	50	40	0.5	5	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	129	62	55	50	24	0.5	1	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	130	60	55	50	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	131	58	55	50	24	0.5	7	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	132	53	55	50	24	0.5	10	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	133	61.9	55	50	24	0.5	3	A	0.1	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	134	59	55	50	24	0.5	5	A	1	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	135	55	55	50	24	0.5	5	A	5	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	136	50	55	50	24	0.5	5	A	10	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	137	58	55	50	24	0.5	5	A	2	1	10	10	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	138	58	55	50	24	0.5	5	A	2	1	10	50	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	139	58	55	50	24	0.5	5	A	2	1	10	80	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	140	60	50	50	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	141	60	60	50	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
	142	60	70	50	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎
143	60	55	40	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
144	60	55	45	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
145	60	55	55	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
146	60	55	60	24	0.5	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
147	60	55	50	24	0.1	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
148	60	55	50	24	0.8	3	A	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
149	60	55	50	24	0.5	3	A	2	1	10	20	0.3	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
150	60	55	50	24	0.5	3	A	2	1	10	20	0.6	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	

[0073]

[Table 6]

表 6

	処理剤、皮膜固形分組成										リン酸アンモニウム配合量 (質量%)	処理剤総固形分濃度 (質量%)	処理条件		評価									
	アイオノマー樹脂		シリカ配合量 (質量%)	水溶性エポキシ化合物		防錆剤		中和度 (質量%)	塩素量 (%)	配合量 (質量%)			種類	配合量 (質量%)	乾燥付着量 (g/m ²)	焼付温度 (℃)	耐アルカリ性	耐酸化性	耐塩かじり性	耐食性	二次塗装密着性	耐溶剤性	処理剤の貯蔵安定性	性 処理剤の貯蔵安定性
実 施 例	151	60	55	50	24	0.5	3	A	2	1	10	20	1.5	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	152	80	55	50	24	0.5	3	A	2	1	10	20	3	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	153	60	55	50	24	0.5 <th>3</th> <th>A</th> <th>2</th> <th>1</th> <th>10</th> <th>20</th> <th>5</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2	1	10	20	5	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	154	80	55	50	24	0.5 <th>3</th> <th>A</th> <th>2</th> <th>1</th> <th>10</th> <th>20</th> <th>1</th> <th>80</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2	1	10	20	1	80	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	155	60	55	50	24	0.5 <th>3</th> <th>A</th> <th>2</th> <th>1</th> <th>10</th> <th>20</th> <th>1</th> <th>100</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2	1	10	20	1	100	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	156	60	55	50	24	0.5 <th>3</th> <th>A</th> <th>2</th> <th>1</th> <th>10</th> <th>20</th> <th>1</th> <th>150</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2	1	10	20	1	150	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	157	60	55	50	24	0.5 <th>3</th> <th>A</th> <th>2</th> <th>1</th> <th>10</th> <th>20</th> <th>1</th> <th>180</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2	1	10	20	1	180	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	158	60	55	50	25	0.5	4.7	A	0.2	0.1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	159	60	55	50	24	0.5	3.5	A	2	0.5 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	160	58	55	50	24	0.5 <th>3</th> <th>A</th> <td>3</td> <td>2<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	3	A	3	2 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	161	50	55	50	24	0.5 <td>1<th>A</th><td>10</td><td>5<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td></td>	1 <th>A</th> <td>10</td> <td>5<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	A	10	5 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	162	61	55	50	24	0.5 <th>3</th> <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	3	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	163	40	56	50	36	0.5 <td>9<th>A</th><td>10</td><td></td><th>5</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	9 <th>A</th> <td>10</td> <td></td> <th>5</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	10		5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	164	50	55	50	34	0.5	10 <th>A</th> <td>5</td> <td></td> <th>1</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	5		1	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	165	89.5	55	50	7	0.5	2 <th>A</th> <td>1</td> <td></td> <th>0.5</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	1		0.5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	166	66	55	50	7	0.5	5 <th>A</th> <td>2</td> <td></td> <th>20</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		20	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	167	68	55	50	15	0.5	5 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	168	43	55	50	40	0.5	5 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	169	63	55	50	24	0.5	1 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	170	61	55	50	24	0.5	3 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	171	57	55	50	24	0.5	7 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	172	54	55	50	24	0.5	10 <th>A</th> <td>2</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	2		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	173	62.9	55	50	24	0.5	3 <th>A</th> <td>0.1</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	0.1		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	174	60	55	50	24	0.5	5 <th>A</th> <td>1</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	1		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	175	56	55	50	24	0.5	5 <th>A</th> <td>5</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	5		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	176	51	55	50	24	0.5	5 <th>A</th> <td>10</td> <td></td> <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	A	10		10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	177	60	55	50	24	0.5 <td>3<th>B</th><td>2</td><td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td></td>	3 <th>B</th> <td>2</td> <td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	2	1 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	178	40	55	50	35	0.5	9 <th>B</th> <td>10</td> <td>1<th>5</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	10	1 <th>5</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	179	49	55	50	34	0.5	10 <th>B</th> <td>5</td> <td>1<th>1</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	5	1 <th>1</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	1	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	180	89.5	55	50	7	0.5	1 <th>B</th> <td>1</td> <td>1<th>0.5</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	1	1 <th>0.5</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	0.5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	181	65	55	50	7	0.5	5 <th>B</th> <td>2</td> <td>1<th>20</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	2	1 <th>20</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	20	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	182	67	55	50	15	0.5	5 <th>B</th> <td>2</td> <td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	2	1 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	183	42	55	50	40	0.5	5 <th>B</th> <td>2</td> <td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	B	2	1 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	184	62	55	50	24	0.5	1 <th>C</th> <td>2</td> <td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	C	2	1 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	
	185	60	55	50	24	0.5	3 <th>C</th> <td>2</td> <td>1<th>10</th><th>20</th><th>1</th><th>120</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th><th>◎</th></td>	C	2	1 <th>10</th> <th>20</th> <th>1</th> <th>120</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th> <th>◎</th>	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎	◎	

[0074]

[Table 7]

表 7

処理剤、皮膜固形分組成										評価												
アイオノマー樹脂			シリカ配合量			水溶性エポキシ化合物		防錆剤		ムリン配合量 アンモニウム	ポリカルボン酸配合量	処理剤総固形分濃度 (質量%) (g/m ²) (°C)	乾燥付着量	焼付温度	耐アルカリ性	耐白化性	耐型かじり性	耐食性	二次塗装密着性	耐溶剤性	処理剤の貯蔵安定性	処理剤の貯蔵安定性
配合量 (質量%)	Tg (°C)	中和度	質量%	質量%	塩基量 (%)	配合量 (質量%)	種類	配合量 (質量%)														
186	56	55	50	24	0.5	7		C	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
187	53	55	50	24	0.5	10		C	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
188	61.9	55	50	24	0.5	3		C	0.1	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
189	58	55	50	24	0.5	5		C	1	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
190	55	55	50	24	0.5	5		C	5	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
191	50	55	50	24	0.5	5		C	10	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
192	60	55	50	24	0.5	3		D	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
193	60	55	50	24	0.5	3		E	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
194	60	55	50	24	0.5	3		F	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
195	61	55	50	24	0.5	3		G	2	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
196	40	55	50	35	0.5	10		G	10	5	5	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
197	49	55	50	35	0.5	10		G	5	1	1	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
198	89.5	55	50	8	0.5	1		G	1	0.5	20	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
199	66	55	50	7	0.5	5		G	2	2	20	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
200	68	55	50	15	0.5	5		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
201	43	55	50	40	0.5	5		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
202	63	55	50	24	0.5	1		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
203	61	55	50	24	0.5	3		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
204	57	55	50	24	0.5	7		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
205	54	55	50	24	0.5	10		G	2	2	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎
206	62.9	55	50	24	0.5	3		G	0.1	1	10	20	1	120	◎	◎	◎	◎	◎	◎	◎	◎

実 施 例

実施例

[0075]

[Table 8]

表 8

	処理工剤、皮膜固形分組成										処理工条件		評価									
	アイオノマー樹脂			シリカ配合量 (質量%)	水溶性エポキシ化合物		防錆剤		リン酸アンモニウム配合量 (質量%)	処理工剤固形分濃度 (質量%)	乾燥付着量 (g/m ²)	焼付温度 (℃)	耐アルカリ性	耐白化性	耐型かじり性	耐食性	二次塗装密着性	耐溶剤性	処理工剤の貯蔵安定性			
	配合量 (質量%)	Tg (℃)	中和度		塩素量 (%)	配合量 (質量%)	種類	配合量 (質量%)														
比較例	1	87	55	50	5	0.5	5	A	2	1	20	1	120	◎	◎	△	×	◎	◎	◎		
	2	60	55	50	42	0.5	5	A	2	1	20	1	120	◎	△-×	△-×	○	◎	◎	◎		
	3	38	55	50	40	0.5	10	A	10	2	20	1	120	△-×	○-△	×	×	◎-○	◎-○	◎-○		
	4	91	55	50	7	0.5	1	A	0.5	0.5	20	1	120	△-×	△-×	◎-○	○	○-△	◎-○	◎		
	5	70	55	50	24	1.2	3	B	2	1	20	1	120	◎	◎	◎-○	○	◎	◎	×	△	
	6	70	55	50	24	9	3	B	2	1	20	1	120	◎	◎	◎-○	○-△	◎	◎	×	△	
	7	72.5	55	50	24	0.5	0.5	B	2	1	20	1	120	×	◎	△	◎-○	×	◎-○	◎	△	
	8	61	55	50	24	0.5	12	B	2	1	20	1	120	△-×	△-×	△-×	○-△	○-△	◎-○	◎-○	△	
	9	70	20	50	24	0.5	3	C	2	1	20	1	120	△	◎	△-×	◎	◎	○-△	◎	△	
	10	70	90	50	24	0.5	3	C	2	1	20	1	120	◎	△	△-×	△-×	○-△	◎	◎	△	
	11	70	55	35	24	0.5	3	C	2	1	20	1	120	○-△	◎-○	×	△	◎	○-△	×	△	
	12	70	55	80	24	0.5	3	C	2	1	20	1	120	×	◎	○-△	△	×	○-△	◎	△	
	13	72.8	55	50	24	0.5	3	-	-	0.1	20	1	120	◎	◎	◎	×	×	◎	◎	◎	
	14	72.85	55	50	24	0.5	3	A	0.05	0.1	20	1	120	◎	◎	◎	×	×	◎	◎	◎	
	15	61	55	50	24	0.5	3	A	11	1	20	1	120	△-×	◎-○	×	△	×	△-×	△-×	△	
	16	70	55	50	24	0.5	3	A	2	1	20	0.2	120	△-×	◎	△-×	×	◎	◎	◎	◎	
	17	70	55	50	24	0.5	3	A	2	1	20	5.5	120	◎	◎	△-×	◎	○-△	○-△	◎	◎	
	18	70	55	50	24	0.5	3	A	2	1	7	1	120	◎-○	◎	◎	○-△	○-△	◎	◎	◎	
	19	70	55	50	24	0.5	3	A	2	1	90	1	120	◎	◎	×	△-×	○-△	◎	×	△	
	20	88	55	50	5	0.5	5	G	2	-	20	1	120	◎	◎	◎	×	◎	◎	◎	◎	
	21	51	55	50	42	0.5	5	G	2	-	20	1	120	◎	◎	△-×	○	◎	◎	◎	◎	
	22	39	55	50	41	0.5	10	G	10	-	20	1	120	△-×	○-△	×	×	×	◎-○	◎-○	◎	
	23	91.5	55	50	7	0.5	1	G	0.5	-	20	1	120	△-×	◎	◎-○	○	○-△	◎-○	◎	◎	
	24	71	55	50	24	1.2	3	G	2	-	20	1	120	◎	◎	◎-○	◎	◎	◎	×	△	
	25	71	55	50	24	9	3	G	2	-	20	1	120	◎	◎	◎-○	◎	◎	◎	×	△	
	26	73.5	55	50	24	0.5	0.5	G	2	-	20	1	120	×	◎	△	◎-○	◎-○	×	◎-○	◎	◎
	27	62	55	50	24	0.5	12	G	2	-	20	1	120	◎-○	◎	◎	○-△	○-△	◎	◎	◎	◎
	28	71	20	50	24	0.5	3	G	2	-	20	1	120	△	◎	△-×	◎	◎	○-△	◎	◎	◎
	29	71	90	50	24	0.5	3	G	2	-	20	1	120	◎	△	◎	△-×	○-△	◎	◎	◎	◎
	30	71	55	35	24	0.5	3	G	2	-	20	1	120	○-△	◎-○	×	△	◎	○-△	×	△	
	31	71	55	80	24	0.5	3	G	2	-	20	1	120	×	◎	○-△	△	◎	○-△	◎	◎	◎
	32	72.95	55	50	24	0.5	3	G	0.05	-	20	1	120	◎	◎	◎	×	×	◎	◎	◎	◎
	33	62	55	50	24	0.5	3	G	11	-	20	1	120	△-×	◎-○	×	×	○-△	△-×	△-×	△	△
	34	71	55	50	24	0.5	3	G	2	-	7	1	120	◎-○	◎	◎	○-△	○-△	◎	◎	◎	◎
	35	71	55	50	24	0.5	3	G	2	-	90	1	120	◎	◎	×	△-×	○-△	◎	×	△	△

[0076]

[Effect of the Invention] Since the water-dispersion metal finishing agent of this invention is prepared combining specific ionomer resin, the water-soluble epoxy compound, the silica, and the non-chromium system rust-proof, it has the high storage stability for one month or more in 40 degrees C or less. Moreover, the surface treatment metal material of this inventions, such as a plating after-treatment product, satisfies solvent resistance, a sex with a blemish-proof, mold galling nature, deep drawing nature, postcoat nature, etc., without spoiling alkali resistance, coating adhesion, and corrosion resistance. Furthermore, since the processing agent and surface treatment metal material of this invention do not contain chromium, they are low pollution. Thus, the surface treatment metal material of this invention excellent in corrosion resistance and low-pollution nature is suitable as configuration members, such as a home electrical-and-electric-equipment product, and building materials, autoparts.

[Translation done.]